specific and absolute conductivity. FARMER calls attention further to the close resemblance between coppice-shoots and saplings of the ash and hazel in respect to their water-conducting systems, and to the difference existing between the coppice-shoots and the normal adult wood of these species.—LADEMA M. LANGDON.

After-ripening and germination of rice.—KONDO[10] has done some very interesting work on the germination of rice seeds. Seeds gathered in the milk stage and put into a germinator immediately show little germination, even after 30 days. Those stored in a condition permitting drying for 15 days, or those stored without drying for 30 days, after-ripen and show a considerable improvement in germination. With after-ripening germination sometimes exceeds 50 per cent. Seeds harvested in the yellow ripe stage show little germination when immediately placed in a germinator, but they improve in germination relatively rapidly with storage, whether the storage conditions permit drying or not, and after 4 months of storage give as good germination as seeds harvested fully ripe. Seeds harvested fully ripe germinate fairly well immediately, but are considerably improved by after-ripening. Seeds harvested dead ripe do not need after-ripening, but are immediately capable of prompt and good germination.

While drying hastens the after-ripening of seeds collected in the milk or yellow ripe stage, those after-ripening without drying finally give quicker and better germination than those after-ripened with drying. The presence of the hulls interferes with after-ripening. A few hours of sun-drying of the fresh seeds favors germination. Diffuse light has no effect on the germination of fully ripened seeds, but it favors the germination of those not fully after-ripened. Germination percentage and energy both rise with progress in the maturity and after-ripening of the seeds. Many grains of rice show abnormal germination. In many of the seeds collected in the milk stage only the radicle grows. In the yellow ripe, fully ripe, and dead ripe grains the abnormality is shown by the growth of the plumule only, often followed later by many secondary roots.

The matter of dormancy and after-ripening of cereal seeds is giving seed testers and other practical workers no little concern, especially in regions where ripening occurs during cool or wet weather.—WM. CROCKER.

Anthocyanin.—The distribution of anthocyanin in varieties of *Coleus hybridus* has been studied by KÜSTER,[11] who classifies the patterns in two groups: (1) sectional, mottled, and pulverulent; (2) areas with curved boundaries and circular flecks. These groups of patterns are traced to different origins. Patterns of the first group are traced to qualitatively

[10] KONDO, MONTARO, Über Nachreife und Keimung veschieden reifer Reiskorner. Ber. Ohara Inst. Landw. Forsch. 1:361–387. 1919.

[11] KÜSTER, ERNST, Die Verteilung des Anthocyans bei Coleusspielarten. Flora 110:1–33. 1917.

unequal cell divisions by which unlike daughter cells arise, one of which possesses ability to produce anthocyan, the other lacking it. In all future divisions of the anthocyanin-producing mutated cells, the daughter cells also inherit the power to produce the color. The contiguous mass of colored cells in a sectional, mottled, or pulverulent pattern is considered the product of a single mutant cell. If the mutation occurs at a very early stage in the life of the plant, sectorial coloration is likely to result. If somewhat later, after the main organs have been laid down, the mottled pattern results. When the cell mutation occurs very late, so that only a few daughter cells are formed by each mutant, the pattern is pulverulent.

Patterns of the second group, rounded areas, and flecks of anthocyanin occur more rarely than those of the first group. Comparison of these patterns with the first indicates that they do not arise by cell mutation. Using seed crystals as an illustration, he suggests the possibility that at certain points anthocyanin-producing "seed colloids" of unknown composition arise, and that around these central points aggregation continues, molecules or molecular groups coming from surrounding cells, which are thus left colorless. This hypothetical colloidal substance would have some direct or indirect relation to the production of anthocyanin, either as a source of building material, or as a catalytic agent.—Chas. A. Shull.

Quantitative nature of sex.—Schaffner[12] has published some significant observations on sex intermediates. The white mulberry shows about 40 per cent pure staminate plants, 40 per cent carpellate, and 20 per cent intermediate in all gradations. Among the last, the most interesting example consists of a pure staminate tree with a single, almost pure carpellate branch, showing "that a sex reversal can and sometimes does take place in an old tissue whose cells are removed by thousands of vegetative divisions from the original zygote. It assures us that sex control is only a matter of finding out how to change the prevailing physiological state." The peach leaf willow showed only 9 per cent intermediates. These were primarily staminate, but had many catkins which were staminate only at the base and became carpellate at the end. "But on the transition zone, between the staminate and carpellate parts, the axis seemed to be neutral in regard to sex, and here bisporangiate flowers were frequently present." Also, in this neutral zone abnormal flowers were very frequent, structures developing which were partly staminate and partly carpellate. These observations serve to support the conclusions published by the author in 1910 to the effect that "sexuality is a condition and not a character" (factor). Observations of much the same nature have recently been published by Stout.[13]—Merle C. Coulter.

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[12] Schaffner, John H., The nature of the dioecious condition in *Morus alba* and *Salix amygdaloides*. Ohio Jour. Sci. **19**:409–416. 1919.

[13] Stout, A. B., Intersexes in *Plantago lanceolata*. Bot. Gaz. **68**:109–133. *pls. 12, 13*. 1919.